SEARCH FOR INVERSION SPLITTING OF PHOSPHINE

SHOKO OKUDA, HIROYUKI SASADA, *Department of Physics, Faculty of Science and Technology, Keio University, Yokohama, Japan*.

Inversion splitting of phosphine molecules has been one of open questions in molecular spectroscopy. A recent calculation predicted that the splitting is 300 kHz and 3 MHz in the v_2 = 3 and 4 states [1], where v_2 is the vibrational quantum number of the ν_2 mode. We have observed three Q-branch transitions in the $3\nu_2$ band of phosphine using a comb-referenced sub-Doppler resolution spectrometer [2]. The spectrometer consists of a difference-frequency-generation source and a cavity-enhanced absorption cell with large beam spot size at beam waist to reduce transit-time broadening. The observed spectral linewidths are 150 kHz, but no inversion splitting has been observed. We now try to observe the $4\nu_2 - \nu_2$ hot band. [1] C. Sousa-Silva, J. Tennyson, S. N. Yurchenko, J. Chem. Phys. **145**, 091102 (2016). [2] S. Okuda, H. Sasada, J. Mol. Spectrosc., in press (2018).